

CLAIMS

1. A method of obtaining a quality image by the use of at least one biometric capacitive fingerprint sensor having a plurality of capacitive sensor cells arranged underneath a surface of dielectric material and each comprising at least one capacitor plate, and a plurality of registers, wherein it comprises the step of modulating any electromagnetic field generated at each capacitor plate in accordance with worst cleaning conditions of said surface of dielectric material, thereby obtaining a quality image with a correct contrast between ridge and valley of a detected fingerprint.

2. A method as claimed in claim 1, wherein the said modulation step comprises

- executing a calibration procedure by means of a capacitative fingerprint sensor set to simulate the worst operating conditions, said calibration procedure being designed to obtain correct values of electric charge intensity for each sensor cell corresponding to one image pixel under said worst cleaning conditions, thereby ensuring good contrast between ridges and valleys in a fingerprint image,

20 - storing said correct values in a memory system, and
- uploading calibration data in said sensor registers at each start of said fingerprint sensor.

3. A method as claimed in claim 2, wherein the said memory system comprises a flash memory controlled by a c.p.u.

4. A method as claimed in claim 2, wherein the said memory system 25 comprises a hard disk in a PC.

5. A method as claimed in claim 2, wherein said memory system comprises a software source code.

6. A method as claimed in any preceding claim 2, wherein the said calibration procedure is carried out according to a software, and wherein

30 - each capacitor plate charge intensity is associated with a grey level of each image pixel, and
- the said charge intensity of each capacitor plate is modulated and adjusted to obtain a correct average grey level of each image pixel.

7. A method as claimed in claim 6, wherein the said charge intensity is modulated and adjusted according to correction factors.

8. A method as claimed in claim 2, wherein the said calibration procedure is carried out according to a software, and

5 - each capacitor plate charge intensity is associated with a grey level of each image pixel, and

- the said charge intensity of each capacitor plate is modulated and adjusted to obtain a correct average grey level of each image pixel, and

wherein the said calibration procedure comprises

10 - setting the said dielectric surface so as to simulate worst cleaning conditions,

- acquisition of correct or adjusted values of charge intensity for each capacitor plate suitable for keeping a good contrast between ridges and valleys whereby obtaining a quality fingerprint image, and

15 - registration of the said adjusted values in a suitable memory system or software source code.

9. A method as claimed in claim 8, wherein the said adjusted values are uploaded into said sensor registries at each start of the fingerprint sensor.

10. A biometric integrated system including a biometric database, at 20 least one biometric capacitive fingerprint sensor having a plurality of capacitive sensor cells arranged underneath a surface of dielectric material and each comprising at least one capacitor plate, wherein each biometric fingerprint sensor comprises a protection case, a swinging frame supported in said protection case and arranged to be angularly moved between an inoperative 25 stand-by position and an operating position in which a fingerprint sensor is facing a user's finger

11. A biometric integrated system as claimed in claim 10, wherein the said swinging frame is mounted for rotation in the said protection case about a transverse pivot pin.

30 12. A biometric integrated system as claimed in claim 11, wherein said protection case has a window and the said swinging frame is shaped as a drum sector and has a pair of side walls, a bridging wall connecting the said side walls and designed to substantially close the said window when the said

swinging frame is in its inoperative stand-by position, and a transverse plane wall provided with an end wing or tab and arranged to locate a capacitative fingerprint sensor having a covering or protection surface of a dielectric material.

5 13. A biometric integrated system as claimed in claim 12, comprising resilient means arranged to urge the said swinging frame to its inoperative position with its protection surface facing towards the inside of said case.

14. A biometric integrated system as claimed in claim 12, comprising an access area of a conductive material provided on said case in a position 10 close to the said window, and upstream of said end tab.

15. A biometric integrated system as claimed in claim 10, comprising an interface card means arranged to connect the said biometric data base and each capacitative fingerprint sensor.

16. A biometric integrated system as claimed in claim 12, comprising 15 an access area of a conductive material provided on said case in a position close to the said window, and upstream of said end tab and at least one electric resistor located in said protection case and arranged to keep the said integrated system above a predetermined temperature threshold.

17. A biometric integrated system as claimed in claim 12, comprising 20 an access area of a conductive material provided on said case in a position close to the said window, and upstream of said end tab, and an electrically operated locking device for said swinging frame.

18. A biometric integrated system as claimed in claim 12, comprising 25 an access area of a conductive material provided on said case in a position close to the said window, and upstream of said end tab, and a smart card reading means (16).

19. A biometric integrated system as claimed in 12, comprising an access area of a conductive material provided on said case in a position close to the said window, and upstream of said end tab, and a telecamera.

30 20. A biometric integrated system as claimed in claim 12, comprising an access area of a conductive material provided on said case in a position close to the said window, and upstream of said end tab, and a radio transponder sensor means.

21. A biometric integrated system as claimed in any preceding claim 10, comprising an interface card means arranged to connect the said biometric data base and each capacitative fingerprint sensor, and wherein the said interface card means includes a ground connection ESD, a cable connecting 5 said ground connection to the said end tab, said wall and said access area, if any, and a start switch arranged to start a routine of a respective fingerprint sensor when the said swinging frame is angularly moved to its operative position.

22. A biometric integrated system as claimed in claim 21, comprising 10 at least one alarm means.

23. A biometric integrated system as claimed in claim 22, comprising at least one serial connection to the said capacitative fingerprint sensor through a cable and serial connection.

24. A biometric integrated system as claimed in claim 10, comprising 15 a c.p.u., a display device, at least one RAM memory, at least one FLASH memory connected to the said c.p.u., and a relay means.

25. A biometric integrated system as claimed in claim 24, comprising at least one keyboard.

26. A biometric integrated system as claimed in claim 24, comprising 20 at least one luminous led in the said swinging frame and a speaker means designed to instruct the user while carrying out an identification procedure.

27. A biometric integrated system as claimed in claim 24, comprising a wireless module for interfacing each fingerprint sensor to the said c.p.u. through antenna means.

28. A biometric integrated system as claimed in claim 10, when used 25 for controlling closing and opening of a door provided with an electrically operated locking means and mounted in a access wall.

29. A biometric integrated system as claimed in claim 28, comprising a first fingerprint sensor arranged on one side of the said access wall and a 30 second fingerprint arranged on the other side, the said locking means being electrically connected to a relay controlled by said c.p.u.